



Efficient Vehicle Smoke Tracking Down System using Raspberry-PI in IOT Automation

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ABSTRACT

In this modern world, mostly everybody have vehicles. A harmful gas from vehicles causes major pollution issues. In 21st century the awareness about the environmental pollution was developed rapidly among the people. Several techniques like catalytic converter were developed and implemented to solve this problem. But whether the pollution is reduced or not is a question mark. This system has been developed using smoke sensor controlled by raspberry pi. This system will automatically detects the ppm value of the smoke exhausted and records in the M-parivahan app. Three levels of pollution level are created and executed. Both the owner of a particular vehicle and a stranger can know about the polluting status of that vehicle. At the extreme stage of pollution, fuel flow is cutoff and location is shared to the nearby RTO office. If this technology is employed the parameter of reduction of pollution level can be achieved.

Keywords: Raspberry pi, mQ 9 gas sensor, GSM, GPS, M-parivahan app

1. INTRODUCTION

One of the key learning platforms for IOT is the Raspberry Pi. Raspberry pi is a popular platform because it offers a complete Linux server at low cost. The RasPi is 40 times faster than arduino when it comes to clock speed. So that it can upload the status of the vehicle more faster with more accuracy. Air pollution causes green house effect whose side effects are well known to us after finding about the holes in the ozone layer [1]. The air pollution also affects sulfur oxide, nitrogen dioxide which damages the crops, forests and other vegetation [2]. The particulate matters from vehicles especially diesel engines emit high level of inflame gases. The major contributors of air pollution oxides of carbon and nitrogen which can be easily detected by semiconductor gas sensor. Reducing the amount of vehicle in the society is a exigent task, because the population has exploded in tremendous level [3]. Hence, in this paper an idea is suggested which would be very helpful in restricting the over polluting vehicles systematically.

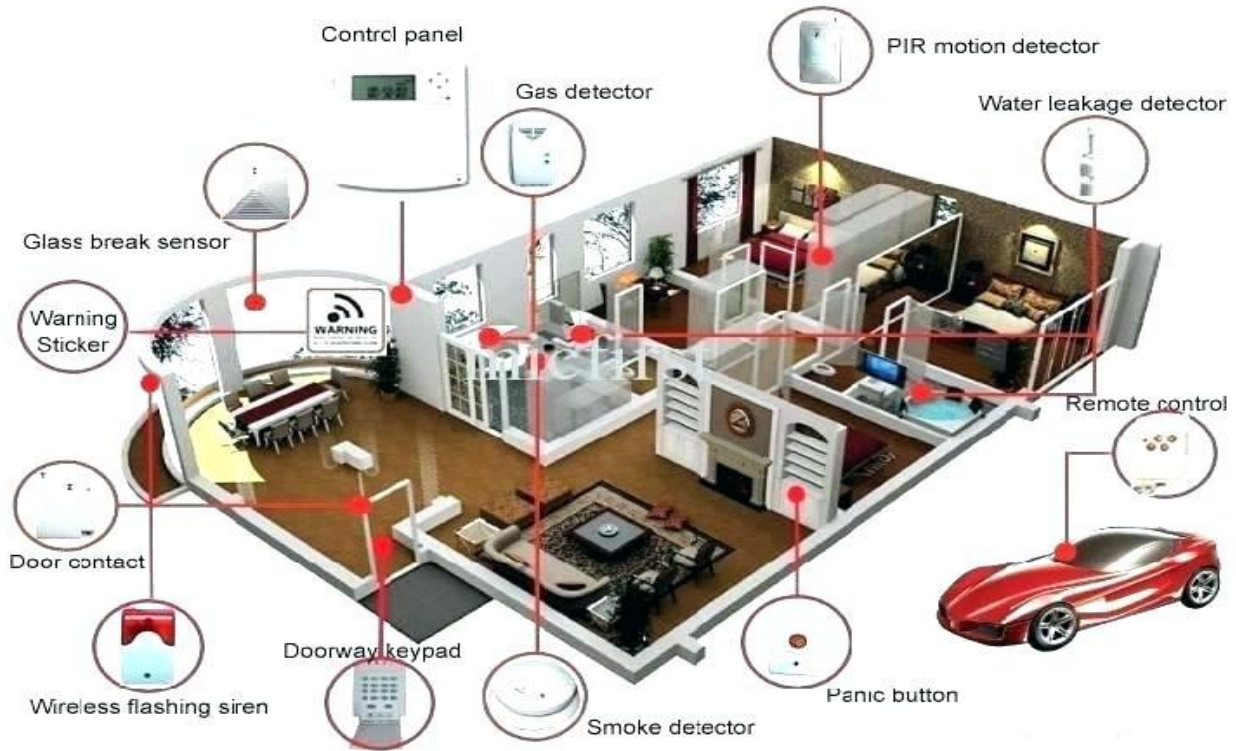


Fig.1 Detection in Transport systems

2. EXISTING SYSTEM

The previously prevailed technology has also a smoke sensor by which the harmful gases are detected and give indication to the person driving the vehicle in the instrument cluster in an analogue display. It enforces to stop the vehicle immediately by alarming beep sound and at extreme level the supply to the fuel injector is cutoff. Hence vehicles won't be in motion.

2.1 Demerits of Existing System

The prevailing technologies have drawbacks in several aspects. They only enforce to stop the vehicle. Sometimes there may be a chance of ignoring the indication and vehicle can be in existence. If the vehicle is suddenly stops in unmanned highway or hilly areas and the people travelling in that particular vehicle has a problem, say heart attack and is in emergency diagnosis, that situation it fails to safeguard the people. Also there may be a chance of making the fuel to flow normally through nearby workshops. Hence the technology has to be implemented with some more slight changes to make it success in real time implementation.

3. PROPOSED SYSTEM

The proposed system consist of following major components

- 1.Detector
- 2.Microcontroller
- 3.Global system module
- 4.Fuel control unit
5. Global positioning system

4. SYSTEM ARCHITECTURE AND HARDWARE DEFINITION

The system architecture for the proposed system is given below:

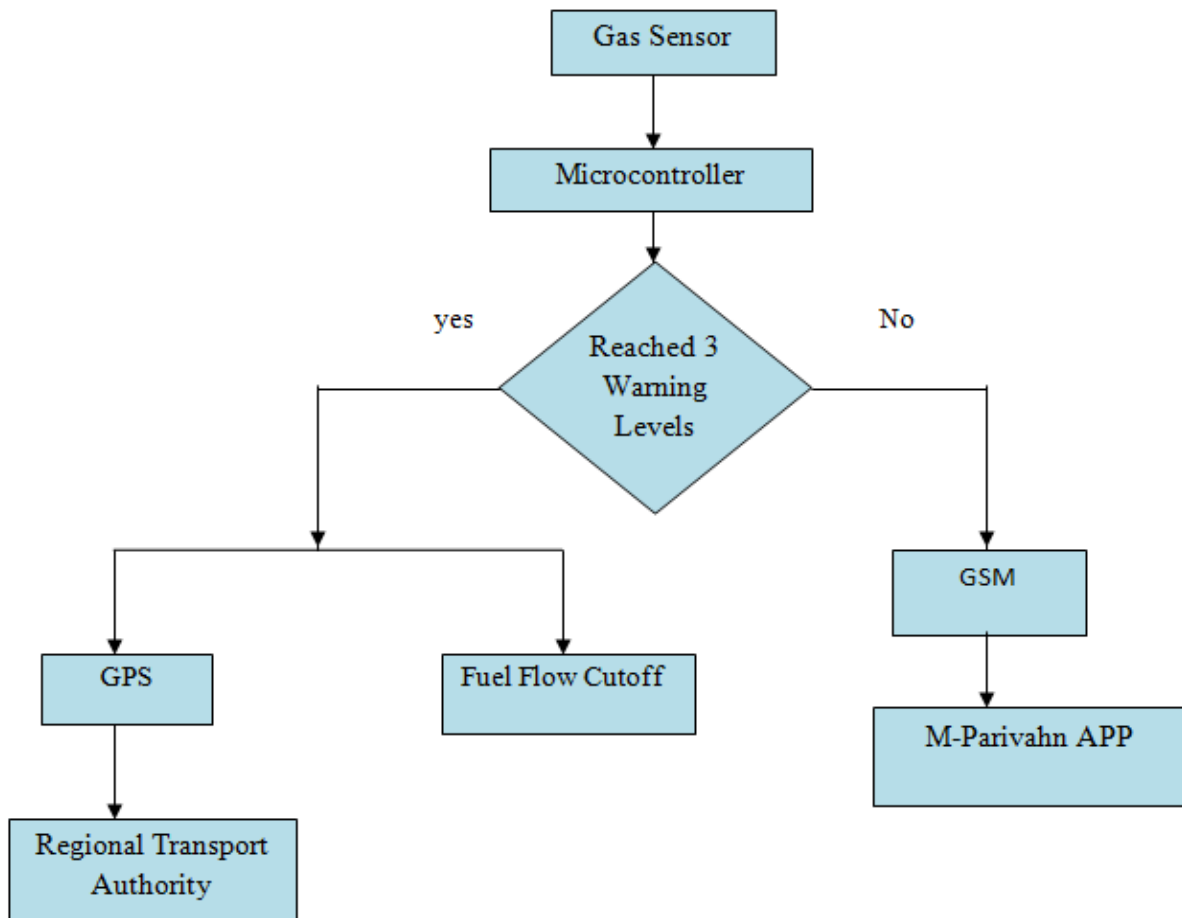


Fig.2 System Architecture

4.1 SMOKE DETECTOR

Smoke sensor is a device which senses harmful gases like carbon monoxide, sulphur dioxide etc...Here the gas sensor detects the smoke produced due to over pollution and sends signal to the microcontroller. An ionization smoke detector uses radioisotope typically americium 241, to ionize air. It goes on detects the smoke and upload the polluting status up-to-date.

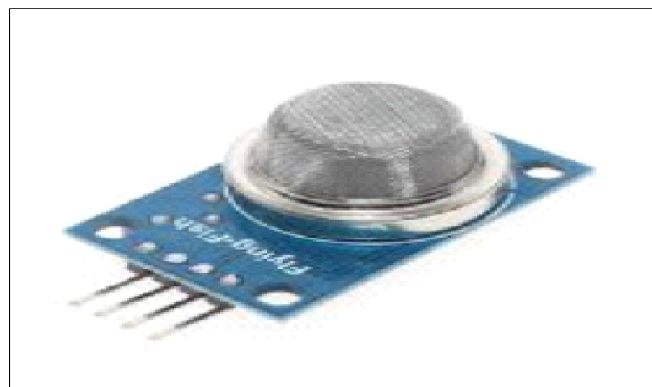


Fig.3 Smoke detector

4.2 MICROCONTROLLER

A microcontroller is a small computer on a single integrated circuit. Microcontrollers are used in automatically controlled devices such as automobile engine control system etc. when the power supply is turned ON, the quartz oscillator begins enabled by control logic register. After the execution of the instruction i.e detecting smoke it makes the system to decide what to do next.

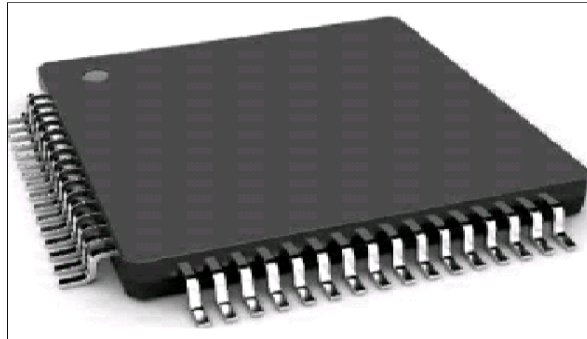


Fig.4 Microcontroller

4.3 GPS

GPS is a device which does not require the user to transmit any data, and it operates independently of any telephonic or internet reception. Nowadays GPS has become an essential feature in automobiles especially in cars for navigation process. In this project it is used for sharing the location of the over polluting vehicle to the regional transport authority. Thus if GPS is installed in a vehicle it can be used for both the purpose.

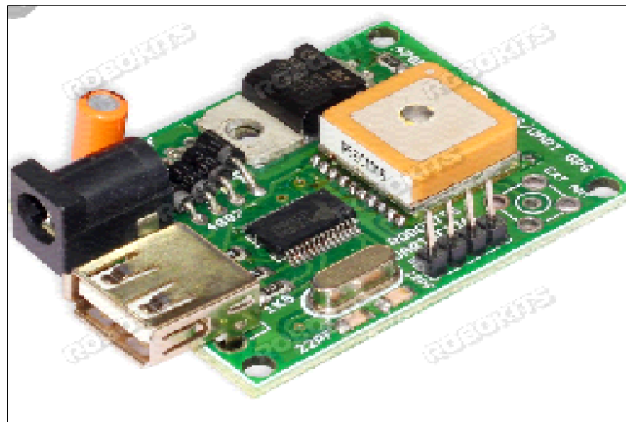


Fig.5 GPS

4.4 FUEL CONTROL UNIT

A fuel control unit attempts to solve problems by acting as an intermediary between the operator's controls and fuel valve. Here it is used to cutoff the fuel flow when the ppm value exceeds the threshold value.



Fig.6 Fuel control unit

4.5 GSM

GSM is a communication standard which is used world wide. GSM was intended to be secure wireless system. This is a cheaper solution than than a two way GPS communication system wherein communication is done in both ways with GPS satellite. This project uses GSM modem with a SIM card which implements the same communication technique as in regular cell phones. Nowadays this system became familiar in cabs for tracking purpose. Hence it can be used for dual purpose.

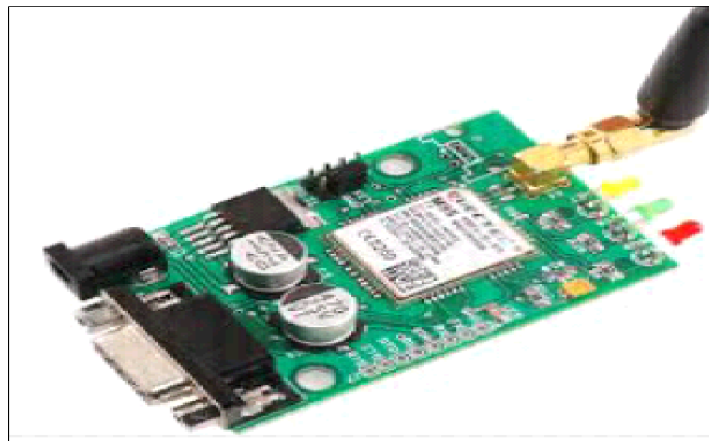


Fig.7 GSM

4.6 WORKING

The system gets engaged on igniting the engine. If the ppm value exhausted by a particular vehicle exceeds the predefined value the sensor triggers the microcontroller. This system is embedded with M-Parivahan app which is introduced by the central government. This app contains all the information about a particular vehicle such as valid date for insurance, road tax etc..In such way specific field is created in that app describing the polluting status of that vehicle. Three levels of ppm values are designed. when a vehicle emits particular ppm , the polluting warning level is credited in that app. GSM is used here to upload the status of the vehicle. when a particular vehicle has a polluting issue it can be seized during the issuing of fitness certificate according to motor vehicle act 1988. The FC should be provided after rectifying the polluting factor. Thus majority of the vehicles can be rectified within 2 levels of warning. sometimes there may be chance of ignoring the fitness certificate or it may be a own board(does not require fitness certificate once in 6 months). In such cases after 3 levels of warning, location and details of the vehicle is sent to nearby regional transport authority via GPS. At this stage the fuel flow to engine is also cutoff. Thus the existence of over polluting vehicle is limited technically in several stages.

4.6.1 Merits

- Since common technologies like GPS, GSM are used in this system, it makes the user to utilizing for multipurpose.
- Depreciate and affordable
- It helps in larger extent to reduce the greenhouse gases
- If the over polluting vehicles are seized there may be chance of reduction in total number of vehicles in the society.

4.6.2 Demerits

- In case of using uncertified sensors it may not work properly.

5. CONCLUSION

Thus by employing this technique, we can monitor and seize the over polluting vehicle easily in toll booths. This system has a potential to execute the operation at faster rate with high accuracy. The IOT tool Raspberry pi ensures the faster update. Hence it paves pathway to reduce harmful gases which causes global warming.

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